Journal of
Social and Administrative Sciences
www.kspjournals.org
Volume 4 September 2017 Issue 3

Impact of strategic factors on enterprise resource planning implementations

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Abstract. Deciding on the Enterprise Resource Planning system, determining the business needs and determining the Enterprise Resource Planning strategies is a very important issue. The fact that the strategies created by the businesses are simple and understandable to all employees, also has a critical prescription on the success of the Enterprise Resource Planning system implementation. It is very useful for the continuity of the system to conduct a model study on the necessity of Enterprise Resource Planning (ERP) system of enterprises. However, success factors that are important during the election phase may be useful on the success of the system throughout the implementation process. This study aimed to investigate the strategic factors during and after the implementation of ERP system by using survey method. Before the implementation of ERP systems, tactical decisions of the vendor selection, the employee training, determination of the project manager, and the method implementation should be taken. Selection of the method of implementation is very important step. Ignoring this step will reduce the probability of success in the ERP implementation.
Keywords. Enterprise resource planning system, Enterprises, Strategic factors.
JEL. M11, M13, M15.

1. Introduction

Companies have started to have more suppliers and customers in various regions because of globalization. Hence, they have been faced with the need to communicate with their suppliers, to plan their production processes and to please their customers all over the world. Firms must maintain integrity among procurement, production planning and distribution systems and sustain harmony among them. Firms have been committed to providing high-quality products and services in order to improve their chances of survival and have looked for ways to achieve an innovative management structure.

Integration requirements as a result of globalization have resulted in the emergence of new technological structures, adaptation of these new technological structures into corporate structures in order to enhance efficiency of firm management, and more widespread use of these structures. Firms have also developed their ability to adapt technological changes with business solutions and systems implemented in a short time.

There is no guarantee that every Enterprise Resource Planning (ERP) system implemented by firms will be successful. Selection of the most appropriate and useful Enterprise Resource Planning (ERP) system for the operation, efficient modeling of the system, application of the system with a certain methodology, training of the employees, and the implementation of cultural change within the

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company can contribute significantly to the implementation of the Enterprise Resource Planning (ERP) system.

2. Key features of ERP systems

The ERP system can be customized regarding the needs of the firms. Thus, features of the ERP systems can change according to industry and firm size. However, the common features of the ERP systems can be summarized as follows (Klaus *et al.,* 2000):

* ERP is a standard software package that targets all sectors and can be customized during installation.

* ERP has a much more favorable structure to customize than other packages. Their target sector is not defined; hence they can be customized according to the specific needs of the institution during installation.

The basic technical features of the ERP are as follows (Carton & Adam, 2003):

* Coherent graphical interfaces in all application areas.

* A three-tiered client server architecture consisting of application, database and presentation.

These packages have the ability to facilitate the flow of information between all the supply chain processes (internal and external) in an organization. In addition, an ERP system can also be used as a tool to help improve the performance of the supply chain network by shortening cycle times (Gardiner *et al.,* 2002: 357). For many users, ERP is a "do it all" system that covers everything from sales orders to customer service. The ERP integrates the organization's production environment with customers and suppliers (Gupta, 2000: 114).

3. Purpose of research

The successful ERP installation allows firm to obtain benefits from the system. Unsuccessful installations cause firms to lose large amounts of money, time and efficiency. In this framework, the purpose of the research can be grouped under the following headings:

1. The impact of ERP systems on the success of the firm in general.

2. Analysis of the strategic factors critical to the success of ERP implementation and determination of prominent strategic success factors of ERP implementation for industrial enterprises.

Research survey is restricted to the firms operating in Organized Industrial Zones in Bilecik, Eskisehir and Ankara provinces. Respondents of the survey are employees who are responsible for ERP system in their firms.

SPSS 17.0 for Windows package program was used to evaluate the research data. The confidence level is taken as 95% in all analyzes. When hypotheses were tested, a T-Test (Independent Samples T-Test) was performed to compare the means of independent samples and to determine whether the associated population means are significantly different.

4. The Results of Analysis

Hypothesis 1: Strategic Factors will have a positive impact on Enterprise Resource Planning applications Hypothesis 1.1: Support of top management will have a positive impact on Enterprise Resource Planning applications

Results of T-Test (Independent Samples T-Test) for questions regarding the support of top management are given in Table 1.

Table 1. *T-Test (Top Management's Support)*

Variables	Number of Classes	Mean	Standard Distribution	t-Value	Degree of Freedom	Probability Value
Question 1 As a management, do you think that the ERP system is worth investing in?						
Successful	72	4.60	0.548	2.111	111	0.037
Unsuccessful	41	4.37	0.581			
Question 2 Are senior managers supportive for the business units?						
Successful	72	4.63	0.592	2.034	111	0.044
Unsuccessful	41	4.39	0.586			
Question 3 How many years of experience in ERP systems does the project manager have?						
Successful	72	4.54	0.768	2.032	111	0.045
Unsuccessful	41	4.22	0.881			
Question 4 How many years of experience in project management does the project manager have?						
Successful	72	3.89	0.958	2.487	111	0.014
Unsuccessful	41	4.32	0.722			
Question 5 Has the team manager played an important role in the system implementation?						
Successful	72	4.63	0.568	2.089	111	0.039
Unsuccessful	41	4.39	0.586			
Question 6 What was the organizational level of the team manager?						
Successful	72	1.92	0.783	.094	111	0.926
Unsuccessful	41	1.90	0.768			
Question 7 If the executive board has been involved in the project, did the presidency of general manager to the project accelerate the project?						
Successful	72	4.60	0.548	2.111	111	0.037
Unsuccessful	41	4.37	0.581			
Question 8 If the executive board has not been involved in the project, was there any other control mechanism other than the project team?						
Successful	72	4.63	0.568	2.089	111	0.039
Unsuccessful	41	4.39	0.586			
Question 9 Have project costs been monitored during the course of the project?						
Successful	72	4.63	0.592	2.034	111	0.044
Unsuccessful	41	4.39	0.586			

In order to examine the relationship between senior management support and successful Enterprise Resource Planning implementations, T-test were conducted to determine whether means are significantly different in success situations.

Question 1 aims to determine whether management believes that the ERP system is worth investing in and respective T-Test aims to determine whether there is a difference between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that consideration of the ERP system is worth investing in by management leads to the successful ERP implementation.

Question 2 aims to find out whether senior managers' positive support for the business unit differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that a support of senior managers to the business units positively affect the successful implementation of ERP.

Question 3 aims to determine whether experience of project manager in ERP systems differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) show that previous experience of project manager in ERP systems positively influence the successful implementation of ERP.

Question 4 aims to find out whether previous experience of project manager in project management differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) reveal that previous experience of project manager in project management positively leads to the successful ERP implementation.

Question 5 aims to determine whether the role of team manager in the system implementation differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) point out that important role of team manager in the system implementation positively impact the successful ERP implementation.

Question 6 aims to find out whether the organizational level of team manager differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) display that the organizational level of team manager positively affects the successful implementation of ERP.

Question 7 aims to determine whether acceleration of the project by the presidency of general manager differs between successful and unsuccessful firms

or not. Results of T-value and p-value ($p < 0.05$) indicate that the presidency of general manager to the project leads to the successful ERP implementation.

Question 8 aims to find out whether the existence of any other control mechanism other than the project team differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) reveal that the existence of any other control mechanism other than the project team positively influences the successful implementation of ERP.

Question 9 aims to determine whether the monitoring of the cost of the project during the course of the project differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) point out that the monitoring of the cost of the project during the course of the project positively impact the successful implementation of ERP.

Results of T-Test (Independent Samples T-Test) indicate that top managements' support for the project is very important for the success of the ERP project implementation.

Hypothesis 2: Determination of ERP Strategy will impact positively Enterprise Resource Planning implementations.

Results of T-Test (Independent Samples T-Test) for questions regarding the ERP strategy are given in Table 2.

Table 2. *T-Test (ERP Strategy)*

Variables	Number of Classes	Mean	Standard Distribution	t-Value	Degree of Freedom	Probability Value
Question 10 Has the project been completed on time?						
Successful	72	4.11	0.742	2.137	111	0.035
Unsuccessful	41	3.80	0.715			
Question 11 Has the project budget been sufficient?						
Successful	72	4.54	0.768	2.032	111	0.045
Unsuccessful	41	4.22	0.881			
Question 12 When compared to project objectives, have system operating expenses decreased?						
Successful	72	4.11	0.742	2.137	111	0.035
Unsuccessful	41	3.80	0.715			
Question 13 When compared to project objectives, have the solutions of maintenance problems enhanced?						
Successful	72	3.93	0.828	-2.014	111	0.046
Unsuccessful	41	4.24	0.734			
Question 14 When compared to project objectives, has the business development been realized?						
Successful	72	3.90	0.772	2.535	111	0.013
Unsuccessful	41	3.54	0.674			
Question 15 When compared to project objectives, have the business process and progress in data standardization been realized?						
Successful	72	4.54	0.768	2.032	111	0.045
Unsuccessful	41	4.22	0.881			
Question 16 When compared to project objectives, have inventory transportation costs been reduced?						
Successful	72	3.89	0.958	-2.487	111	0.014
Unsuccessful	41	4.32	0.722			
Question 17 When compared to project objectives, have delays in the fulfillment of customer orders been reduced?						
Successful	72	3.56	0.554	2.071	111	0.041
Unsuccessful	41	3.34	0.480			
Question 18 Either the lack of formal business planning or the lack of planning of ERP systems may cause problems during installation and the implementation.						
Successful	72	3.67	0.904	-2.377	111	0.019
Unsuccessful	41	4.07	0.818			
Question 19 Both the lack of formal business planning and the lack of planning of ERP systems may cause problems during installation and the implementation.						
Successful	72	3.43	0.802	2.077	111	0.040
Unsuccessful	41	3.12	0.678			
Question 20 Planning function of ERP systems reacts to the business plan, but it has no contribution to the business planning process						
Successful	72	4.78	0.419	14.308	111	0.000
Unsuccessful	41	3.51	0.506			
Question 21 The business plan is inter-connected with ERP system. The system resources are matched with the requirements of the job.						
Successful	72	4.60	0.494	13.322	111	0.000
Unsuccessful	41	3.29	0.512			

In order to examine the relationship between ERP strategy and successful Enterprise Resource Planning implementations, T-test were conducted to determine whether means are significantly different in success situations.

Question 10 aims to find out whether the completion of the project on time differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that the completion of the project on time positively affects the successful implementation of ERP.

Question 11 aims to determine whether sufficiency of the project budget differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) show that sufficiency of the project budget positively influences the successful implementation of ERP.

Question 12 aims to find out whether decrease in operating expenses compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) reveal that decrease in operating expenses compared to the project objectives leads to the successful ERP implementation.

Question 13 aims to determine whether enhancement in the solutions of maintenance problems compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) point out that enhancement in the solutions of maintenance problems compared to the project objectives positively impact the successful ERP implementation.

Question 14 aims to find out whether the realization of the business development compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) display that the realization of the business development compared to the project objectives positively affects the successful implementation of ERP.

Question 15 aims to determine whether the realization of the business process and progress in data standardization compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that the realization of the business process and progress in data standardization compared to the project objectives leads to the successful ERP implementation.

Question 16 aims to find out whether lowering inventory transportation costs compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) reveal that lowering inventory transportation costs compared to the project objectives positively influences the successful implementation of ERP.

Question 17 aims to determine whether lowering delays in the fulfillment of customer orders compared to the project objectives differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) point out that lowering delays in the fulfillment of customer orders compared to the project objectives positively impact the successful implementation of ERP.

Question 18 aims to find out whether the lack of formal business planning or the lack of planning of ERP systems differs between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that the lack of formal business planning or the lack of planning of ERP systems negatively impact the successful implementation of ERP.

Question 19 aims to determine whether both the lack of formal business planning and the lack of planning of ERP systems differ between successful and unsuccessful firms or not. Results of T-value and p-value ($p < 0.05$) indicate that both the lack of formal business planning and the lack of planning of ERP systems negatively affect the successful implementation of ERP.

Results of T-Test (Independent Samples T-Test) indicate that the existence of ERP strategy is very important for the success of the ERP project implementation.

5. Conclusion

Enterprise Resource Planning (ERP) projects on the failure of the assessments are relatively increasing that may cause co-operation bankruptcy. In order to successfully implement the ERP system and to avoid failure, the enterprise must conduct careful and premier analysis and develop a plan for the acquisition and implementation of ERP. The most important success factors for ERP

implementations include top management support, effective project management, effective user training, and an examination of the ERP as a business solution. Factors such as inadequate technology planning, training and training of users, excessive planning of operations and the presence of adequate skills are considered as reasons for the failure of the ERP. The commitment of the management is necessary for the success of the ERP system. This commitment should be combined with work place culture and employees through team building efforts and training programs.

Managers should consider the acquisition and implementation of the ERP as the main investment decision with the following expectations:

* ERP system is a business solution, it is not an information technology project

* There is a degree of uncertainty related to the acquisition and implementation of the ERP because it is difficult to estimate savings and it is difficult to anticipate developments due to continuous changes in the system.

* The ERP has a greater impact on the organization than the traditional system changes.

* It is difficult to attribute the invisible benefits of the ERP to the money.

* The implementation of ERP contains effective organizational changes depending on personal alterations.

Information technology is an important area where firms make serious investments and they aim to increase their performance with the implementation of it. Our results indicate that firms have improved their performance with the implementation of ERP systems. Our results also indicate that the implementation of ERP also contribute to the market performance of firms.

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